

Efficacy of prophylactic antibiotic use in breast cancer surgery in obese patients

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National Nosocomial Infection Surveillance System (NNIS) and Centre for Disease Control and Prevention in 2002 reported that of the 1.7 million hospital acquired infections reported annually, Surgical Site Infection (SSI) contributed up to 20% of cases and 8% of hospital acquired infection related mortality (1). The increased expenditure related to SSI has been estimated to be \$166 million to \$345 million annually (2).

Surgical site infection in breast surgery can be costly on many counts such as prolonged hospital stay, increased clinical visits, wound care, poor aesthetic outcome and delayed adjuvant treatment for cancer and potentially can be associated with a reduced survival. Even though it is considered as a clean surgery, the reported incidence of SSI is between 3-5% (3-6). The predisposing factors for increased incidence of SSI in breast surgery can be variable and the important risk factors include, smoking, immunosuppressants and obesity. Davis GB *et al.* published a study based on the American college of surgeons' national surgical quality improvement program (ACS NSQIP) registry and evaluated incidence rate of SSI within 30 days in patients undergoing mastectomy without reconstruction as well as identified the independent risk factors contributing to this (7). Even though, this review of 38,739 patients, the reported incidence of SSI rate was only 2.3% the significant risk factors included a body mass index of greater than 25 along with smoking, diabetes mellitus and operation duration >2 hours. BMI between 30 and 35 increased the risk of SSI by 1.77 times.

Villar-Compte *et al.* prospectively analysed the variations in SSI over a period of 5 years in patients undergoing breast surgical procedures (8). They observed a SSI rate of 18.7% in 2,338 surgical procedures. Interestingly, 56.3% of these

infections were deep incisional infection. They found that more than 50% of patients were obese with a BMI >30. In this continuous surveillance programme, the authors found that various measures taken to reduce the SSI rate have decreased the SSIs in breast cancer surgery from 33.3% to 18.9%. These preventative measures included the use of prophylactic antibiotics as well.

Preoperative Prophylactic antibiotics are found to be useful in reducing SSI and related morbidities and extra costs. However, its cost effectiveness in clean surgical procedures is debatable (9,10). A recent meta analysis by Sajid *et al.* looked at 9 eligible randomized control trials (RCT) and found that preoperative prophylactic antibiotics reduced the SSI in breast surgery and the risk of adverse reaction from this practice is not significant (11).

Cochrane review had looked at 9 RCTs comparing the preoperative prophylactic antibiotic use in breast surgery and found that prophylactic antibiotics significantly reduces the risk of SSI in breast surgery and of the 7 studies who reported adverse events in related to the antibiotic use, only one study indicated increased incidence of adverse reactions with intervention (12,13). However, there was a wide variation in the antibiotic regimen for the use of prophylaxis.

Gupta *et al.* in a randomized Control trial of 334 patients did not find any benefit of prophylactic use of antibiotic in patients undergoing breast surgical procedures (13).

Prophylactic antibiotic use is not without any risks and increased use may lead to antibiotic resistance and adverse reactions such as clostridium difficile infection.

Recently published RCT by Gullouglu BM *et al.* has showed that the incidence of SSI in patients undergoing

breast surgical procedures with a BMI of >25 without any reconstruction was 13.7% in patients who did not have antibiotic prophylaxis and 4.8% in those with prophylactic antibiotics. The rate of SSI was significantly high in patients with BMI greater than 25 (13.7% *vs.* 3.5%) when compared to patients with normal weight which reiterates the fact that obesity is a risk factor for SSI. Interestingly, all SSI's in both arms in this study were observed in patients with a BMI or >30 (14). In this trial, the cost analysis showed a significantly higher SSI related treatment cost of 20.26 USD when compared to those in prophylaxis group with a cost of 8.48 USD.

Many studies which has shown that obesity is a risk factor for SSI in breast surgical procedures, but more information is needed to clearly define the set of group of patients who will benefit most from use of antibiotic prophylaxis. Most of the time, the decision on prophylactic antibiotic use may have to be individualised as patient carry multiple risk factors.

Limitations of studies looking at the use of prophylactic antibiotic use in breast surgical procedures is lack of standardisation of the type of antibiotic, the dosage and the definition of surgical site infection used. Future trials should address these issues to define the role and efficacy of antibiotic prophylaxis in the field of breast surgery.

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